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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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CALIFORNIA CITRUS PSOROSIS SURVEY

Joseph S. Tidd

In an attempt to further knowledge regarding losses from psorosis (California scaly bark of citrus), the writer was assigned in February 1944 to the California Citrus Psorosis Survey under the supervision of H. S. Fawcett of the Citrus Experiment Station at Riverside. The results obtained by the writer, as well as those obtained by Dr. Hubert A. Harris in November and December 1943, are summarized in Table 1 and refer to psorosis A, which is the most common of the psorosis varieties. Cases of concave-gum and blind-pocket psorosis were not encountered in numbers sufficient to warrant including in this report.

After preliminary studies on this virus disease at the Citrus Station, selected groves of Washington navel oranges were surveyed at Azusa in Los Angeles County and later, Valencia groves in Orange County. Dr. Harris had worked with navel groves in Riverside and Tulare Counties. Maps were made of the groves, the trees being inspected tree by tree and appropriate symbols used to indicate the presence or absence of scaly bark lesions, whether they were to be found on limbs or trunk or both, the stage of severity, and whether the trees had been treated. An estimate was made of the number of boxes of fruit on each diseased tree as well as on the next adjacent healthy tree. The same was done for young trees or replants.

The navel groves at Azusa and Valencia groves in Orange County were also examined for the presence of stubborn disease, a probable virus trouble, recently described by Dr. H. S. Fawcett and co-authors in Citrograph for April 1944. Maps were also made for each of the growers cooperating in the project as well as a statistical summary of the findings in his grove.

Twelve groves of navel oranges were surveyed for psorosis and 6 of Valencias. In Table 1, the navel groves are numbered from NA to NL, the Valencia groves from VA to VF. With the navel orange groves, the trees ranged in age from 25 to 50 years, the Valencias from 16 to 27 years. An estimate of crop loss from replants is included in the table because in most instances, the better growers replace severely injured psorosis trees with new young trees. Since the latter, being younger, do not produce the crop of fruit that would be possible were they the age of the original, healthy trees in the grove, this difference in production capacity is considered as a loss attributed to scaly bark.

When it is recalled that the psorosis virus is carried over to seedling trees by budding from infected parent trees, which may appear healthy (bark symptoms not showing for at least 6 or many more years from the time of budding a seedling); that some new infection of healthy trees may come about by root grafts; and that at the time the groves studied were planted, nothing was known about the nature and transmission of this disease, it is not surprising that the figures, in the column in Table 1 giving the percent of infected trees, are so variable, ranging from 0.45% psorosis in Grove NF to 29.87% in grove VE. Add to this the fact that different strains of the virus differing in virulence probably occur as well as differences in host resistance. New outbreaks may, therefore, be expected to appear from time to time.

If the plants were set out to replace psorosis trees as they have been in most cases, and these figures for percent of replants added to those for

Table 1. California Citrus Psorosis (California Scaly Bark) Survey, 1943-44

Grove No.*	Age in years	Number of trees	% of trees infected	% of replants: Psorosis	% from Replants	Estimated Crop Loss: Total estimated Crop Loss - %	% less fruit produced by a Psorosis tree
NA	25	640	5.47	3.91	1.58	3.19	4.77	29.05
NB	±29	637	28.57	2.51	9.65	2.28	11.93	33.77
NC	31-32	491	6.52	5.72	1.22	4.79	6.01	18.79
ND	32	434	2.76	1.15	.31	1.03	1.34	11.27
NE	32	385	11.69	1.56	3.08	.91	3.99	15.44
NF	32	440	.45	.00	.10	.00	.10	21.24
NG	±47	822	16.18	15.09	3.50	12.76	16.26	21.63
NH	50	629	7.79	10.00	1.79	8.14	9.93	23.12
NI	50	717	19.94	8.93	6.13	7.56	13.69	30.73
NJ	50	407	9.58	10.81	3.58	9.18	12.76	37.26
NK	35(?)	3693	5.90	6.28	2.10	5.47	7.57	35.57
NL	35(?)	688	4.94	5.23	3.01	4.43	7.44	60.67
VA	16	1103	12.87	1.18	2.07	.83	2.90	16.00
VB	18	752	8.38	1.20	.87	.89	1.76	10.38
VC	18	1419	10.50	.28	2.87	.15	3.02	27.34
VD	±25	384	27.86	13.28	5.74	11.27	17.01	20.56
VE	25	318	29.87	1.89	9.13	1.79	10.92	30.54
VF	27	360	27.69	3.06	9.54	2.13	11.67	35.24

* Navel orange groves are numbered NA to NL; Valencia orange groves, VA to VF. Groves NA, NH, NI and NJ in Los Angeles County; NB to NF inclusive in Tulare County; NG, NK and NL in Riverside County; VA to VF inclusive in Orange County.

percent of trees psorosis-infected our figures for the amount of scaly bark would run much higher.

Also shown in Table 1, grove by grove, are the figures on a percentage basis of the estimated crop loss. These are given for psorosis and the replanted trees, the latter being included for reasons already mentioned. The two are combined to obtain the total estimated loss. It is to be noted that these figures vary, and for the same causes that the number of psorosis trees vary. Furthermore, the psorosis trees in some of the groves had been treated by the scraping method and by pruning. Probably another cause for variation is the fact that at certain stages in some cases, psorosis stimulates a tree to produce a larger crop of fruit than if it were uninfected. Our individual tree-by-tree production figures showed occasional examples of this type. In the final stages, however, limbs are killed and eventually most of the tree.

In general, it would appear that the older navel groves (NG to NJ inclusive) show a higher percentage of loss due to psorosis. The same is true of the older Valencia groves (VD to VF inclusive). These latter have as much loss due to psorosis as the navel trees twice their age. But the older groves, for the most part, had more psorosis-infected trees and therefore, the loss might be expected to be higher. Because of the variables encountered in a

study of this kind, more definite conclusions could be drawn from a larger number of surveys of individual groves.

The last column in Table 1, however, would appear to indicate that in older orange groves (navel trees 35 to 50 years of age and Valencias in the 25 to 27 year class), the amount of fruit produced by a psorosis tree averages about 1/3 less than that produced by a normal, healthy tree in the same age and variety group, in spite of the fact that many of the psorosis trees in severe stages have been replaced by replants.

Stubborn disease of citrus was encountered in none of the Valencia groves and in only 3 of the 4 navel groves surveyed by the writer. Three scattered cases in grove NI, each produced 49.5% less estimated fruit than a normal tree. Five "stubborn" trees in grove NJ each produced 42.2% less, while 23 such diseased trees in grove NH produced an estimated 30.1% less fruit as compared with a healthy tree of the same age. It should be stated that 2 of the 3 "stubborn" trees in grove NI and 5 in grove NH also had scaly bark. Three of the "stubborn" trees in NJ were replants. The trees with both psorosis and stubborn disease were not, however, included in the statistics on psorosis already discussed and summarized in Table 1.

Although the estimated total crop reductions due to psorosis and stubborn disease do not appear high, they amount to a considerable economic loss when it is realized that a 25-year-old grove will produce 400 to 600 boxes or more of oranges an acre. In normal times, such figures as given in this report might mean the difference between profit and loss. When the severity of infection increases with age of trees, the potential loss, as shown in the last column in Table 1, is even more significant. Apparently, to prevent psorosis (California scaly bark) in new plantings, growers must be educated to use registered buds on virus-free seedlings.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON DISEASES OF FRUIT CROPS

Scab (Venturia inaequalis) was the disease most commonly noted on Apple in southwestern Iowa, the amount of infection varying inversely with the number of sprays applied. Blotch (Phyllosticta solitaria) and black rot (Physalospora obtusa) were present on the leaves. Apple rust (Gymnosporangium juniperi-virginianae) was observed on young trees in a nursery (Edgar F. Vestal, period ending June 26).

Scab was found in each of 16 apple orchards visited in the Missoula and Flathead Lake districts of western Montana, the amount present varying from a trace in one well-sprayed orchard at St. Ignatius, to 50% of the leaves and 10% of the fruits diseased in one orchard near Missoula. Fireblight (Erwinia amylovora) was observed to be causing considerable damage on a few apple trees at the southern end of Flathead Lake (C. M. Slagg, week ending June 24).

Cherries in the Shenandoah region of Iowa were infected with leaf spot (Coccomyces hiemalis) where spraying had not been effective, and some bacterial spot (Bacterium [Xanthomonas] pruni) was also present (Vestal). Leaf spot was the primary cause of the conspicuous yellowing of cherry trees in home orchards in the east-central portion of Missouri (T. W. Bretz, week ending July 1). In Montana, leaf spot and brown rot (Sclerotinia cinerea) [? Monilinia fructicola] were observed in several orchards

of sour cherries on the eastern shore of Flathead Lake, whereas nearby sweet cherries were not affected (Slagg).

Peaches in Iowa appeared rather free from the common diseases. Neither leaf curl [Taphrina deformans] nor brown rot [Monilinia fructicola] was observed causing serious damage (Vestal).

Rust (Physopella fici), leaf blight (Rhizoctonia microsclerotia), and leaf spot (Cladosporium sp.) were found on Fig trees along Bayou LaFourche and at Houma in southern Louisiana. Owing probably to dry weather, these diseases are generally mild at present; however, at Houma leaf blight appeared to be causing considerable damage (Douglas C. Bain, June 26-30).

Orange rust (Gymnoconia peckiana) was observed on Black Raspberry in south-central and eastern Wisconsin (Edwin E. Honey, June 8 - 16). -- Reports of Emergency Plant Disease Prevention Project Surveys.

PREVALENCE OF RHYNCHOSPORIUM SCALD ON BARLEY IN ARKANSAS IN 1944

H. R. Rosen and Howard W. Larsh

In the current season, 1944, Rhynchosporium scald (R. secalis) was by far the most common and the most destructive disease of winter barley prevalent in this State. It was noted as being abundant in early April in nursery rows of barley varieties being tested for leaf-rust and powdery-mildew resistance and scarce or absent on all plots and varieties derived from seed treated with an organic mercury compound (New Improved Ceresan).

By April 27 scald became so destructive on numerous varieties present in the nursery rows that a loss of 50 to 75% of the leaf area was estimated, based on counts of the number of leaves or parts left alive in proportion to the total number of leaves counted per stalk. On that date most of the varieties were in the flag-leaf stage with few or no heads appearing.

With abundant rains, the disease continued to develop to such an extent that by the third week in May, when the kernels had reached the milk stage, the leaf area was almost wholly killed by scald and there was little opportunity for leaf rust or Helminthosporium spots to appear.

Estimates of the amount of leaf area killed by April 27 were made on all varieties growing in the leaf rust and powdery mildew resistant varieties distributed by Dr. G. A. Wiebe. The following were highly susceptible, the estimated percentages of leaf area killed being 50 to 75: No. 15-C.I. 4290, No. 16-C.I. 4295, No. 17-C.I. 4298, No. 18-C.I. 4306, No. 19-C.I. 4308-2, No. 20-C.I. 4309, No. 22-C.I. 4314, No. 24-C.I. 4316, No. 25-C.I. 4326-1, No. 26-C.I. 4326-2, No. 27-C.I. 4327, No. 28-C.I. 4329, No. 29-C.I. 4334, No. 30-C.I. 4343, No. 31-C.I. 4952, No. 32-C.I. 4953, No. 33-C.I. 4967, No. 35-C.I. 4972, No. 36-C.I. 4973, No. 37-C.I. 5006, No. 38-C.I. 5007, No. 39-C.I. 5008, No. 40-C.I. 5018, No. 41-C.I. 5091, No. 42-Hokudo C.I. 5176, No. 43-C.I. 5557, No. 44-C.I. 5559, No. 45-C.I. 5564, and No. 46-C.I. 5565.

The following varieties showing percentages varying from a trace to 25%: No. 1-Tennessee Winter C. I. 6034, No. 2-Greece C. I. 221, No. 3-Tenarab C. I. 662, No. 4-Black Russian C. I. 705, No. 5-Ghest C.I. 979, No. 6-Black Russia C. I. 2202, No. 7-Donjon C. I. 2266, No. 8-C.I. 2349, No. 10-Early Black Turkestan C. I. 3093, No. 11-C.I. 3356, No. 13-C.I. 3527-2, and No. 14-C.I. 3528.

It will be noted in the above lists that Tennessee Winter appears to possess either resistance or escaping qualities. There were 5 replicates of

this number present in rows 1, 12, 23, 34, and 47 and the estimated amount of leaf area killed varied from a trace to 25% in the different rows. However, further tests are necessary before it would be safe to conclude that this and all other varieties with low percentages in 1944 are actually resistant to scald. Johnson and Mackie (Phytopath. 10:54, 1920) reported 3 different selections of Tennesse Winter as showing resistance.

A few notes on symptoms may be helpful. The marginal concentric rings described by Caldwell (Journ. Agr. Res. v. 55:175-198, 1937) were rarely present in 1944. Secondary organisms are common on infected spots, including fungi with dark, septate condiophores resembling those of Helminthosporium sativum (but no conidia of the latter were found). A very high percentage of infections occurred at the base of the leaf blades, in the region of the ligules, the infections often completely encircling their bases and including the auricles. Such infections frequently resulted in the yellowing and death of whole blades. Localized blade infections may be relatively small, lenticular spots, 0.5 to 1.5 cm in the longest diameter and 1 to 2 mm in the shortest, or frequently streaks varying in length from one to several cm and only to a few mm wide. Since the earliest stage of infection are likely to be overlooked under field conditions, it is not certain that the writers have seen these stages. Caldwell (l.c.) describes them as being dark bluish-gray with a water-soaked appearance. As observed in Arkansas, what appeared to be young infections took the form of dark brown spots and streaks which as they aged became light brown to straw colored in the interior, delineated by a much darker brown, narrow margin.

The spots are usually considerably larger than in Helminthosporium spot blotch and as Caldwell noted are readily distinguished from the latter, mostly by size and by the difference in color between margin and interior. As observed under a binocular microscope, there is no evidence of cuticular disruption but not having sectioned any material, it is impossible to contradict Caldwell who found the cuticle pushed away leaving the stroma of the fungus "completely superficial". The writers have not been able to identify superficial stroma as such, although it is easy to find the typical hyaline, 2-celled, beaked spores of Rhynchosporium by simply scraping the surface of a spot and mounting the scraped material in water. So far as Arkansas material is concerned, the fungus cannot be identified by looking for superficial stroma with a hand lens or under a binocular microscope and Caldwell's figures indicate that this is only observable in carefully sectioned material examined under a compound microscope.

Judging by the information now at hand, the statement made above concerning the scarcity of scald infections on plants derived from seed treated with an organic mercury compound would seemingly be of no particular significance. Dickson (Diseases of Cereal and Forage Crop Plants, p. 16) states definitely that there is no evidence that the disease is seed-borne and under control measures for this disease, no seed treatments are recommended. Nevertheless, it appears worthwhile to determine if seed treatment with an organic mercury compound is of value. It is now well established that some of these organic preparations not only control seed-borne but also soil-borne inoculum.

The very large amounts of infection in early part of the 1944 season on nearly all plots where seed were not treated, contrasted markedly with the few or no infections on all plots sown with treated seed. On the latter the disease did not appear in any abundance until late in the growing sea-

and apparently were infected then by inoculum derived mostly from plants infected early.

AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF ARKANSAS, AND EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON DISEASES OF CEREAL CROPS AND GRASSES

CONDITION OF CORN AND WHEAT IN KENTUCKY: This survey was made June 21 to 29, in central Kentucky from Franklin to Hopkinsville, Louisville, Covington, and Lexington. Moderate to severe drought conditions were encountered over the entire area.

Rather casual observations were made on 600 acres of Corn in 87 fields, avoiding fields on hilly or obviously poor soil. Nearly 50% of this acreage showed a reduction in stand of 5 to 20 or 25%, occasionally more. A small percentage had been replanted. The reason for reduced stand is unknown but part of the reduction in the later plantings was probably due to the drought.

Supplementing an earlier survey a rather intensive search was made for Wheat bunt (Tilletia sp.). Nine hundred acres in 58 fields were surveyed. Measurable amounts of bunt were found in 4 fields in Simpson, Logan, and Hopkins Counties. A trace (less than 0.1%) was found in 7 fields in the above counties and in Chio and Gallatin Counties. The weighted average of bunt for all the acreage observed was 0.2%. The 4 fields with a measurable amount of bunt had 7, 3, 1.4, and 0.75%. Stem rust [Puccinia graminis] was rated as light in most fields; as severe in about 10% of the fields. -- R. A. Hyre, Emergency Plant Disease Prevention Project.

DISEASES ON CORN, SORGHUM, AND SORGHUM VARIETIES IN SOUTHERN LOUISIANA: In many Corn fields throughout the southern portion of the State, brown spot (Physoderma zeae-maydis) appeared to be severe on leaves and sheaths. Other fields were noted in which leaves were completely free from the disease. Rust (Puccinia sorghi) is generally distributed but not severe. Gloeocercospora sorghi was found to be abundant on middle and lower leaves of corn in a field near Baton Rouge. This fungus, which caused the zonate leaf spot of sorghum, was found on corn in the same field in 1942. Thus far, this is the only location where this disease has been found on corn, as far as is known.

In Sorghum test plots at the Louisiana State University Experiment Station and in small fields along the upper part of Bayou LaFourche, zonate leaf spot is making its appearance in considerable amounts. Rust (Puccinia purpurea) was observed in 2 small fields near Napoleonville and Labadieville.

Zonate leaf spot, rust (P. purpurea) and anthracnose (Colletotrichum graminicolum) on leaves appeared to be abundant in 3 small Broomcorn fields in Ascension and Assumption Parishes.

Zonate leaf spot was found to be causing severe damage to leaves of Tift Sudangrass at Houma. A small (1-8 mm), ovate to elliptic, concentrically-ringed spot was found on leaves of the same plants. A species of Helminthosporium (not H. turcicum) was recovered from material brought in to the laboratory. This is the first time that this disease has been observed by the writer in this State. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. June 26 - 30.

SMALL GRAIN DISEASES IN ARKANSAS: In company with Dr. H. R. Rosen an extensive survey was made of the small grain diseases in the principal cereal growing counties in the State, May 15 to June 3.

Barley. - Approximately 350 acres were surveyed. With very few exceptions leaf rust (Puccinia anomala) occurred rather late in the growing season and in most instances resulted in very little, if any, reduction in yields. The most severely infected plants were observed in plantings on the Livestock and Forestry Branch Experiment Station, Batesville, where an estimated 35 to 40% reduction in leaf surface resulted from leaf rust when plants were in the milk stage. Scald (Rhynchosporium secalis) was the most common disease of barley observed in Arkansas during the 1943-1944 season. Early infections were very common on barley at the Main Experiment Station Farm, Fayetteville. Spot blotch (Helminthosporium sativum) and net blotch (Helminthosporium teres) infections were present in only a few plantings. Little loss resulted, except at Batesville and Stuttgart where a 20% reduction in leaf area due to spot blotch was observed. Powdery mildew (Erysiphe graminis) appeared quite late and was abundant in only a few fields, being limited to the lower leaves in most instances. In the most severely attacked planting, at Fayetteville, all of the leaves were infected, including the flag leaves. Loose smut (Ustilago nuda) and covered smut (Ustilago hordei) were found causing very little damage during this season in most fields. In most instances a few smut-infected heads appeared in each barley planting but in plots of Texan barley at Fayetteville approximately 5% of the heads showed loose smut. Stem rust (Puccinia graminis) was observed in one planting only and even there the incidence was insignificant. Septoria leaf blotch (Septoria passerinii) occurred in several plantings; in no instance was the infection causing more than negligible damage.

Winter Oats. - Approximately 2760 acres were surveyed. Crown rust (Puccinia coronata) was observed, in most instances, where susceptible varieties had been seeded, i.e., Lee, Forkedeer and others. In cases where Red Rustproof strains had been sown, relatively few plants were found infected with crown rust; however, "off-types" were usually infected. In trial plantings at the Cotton Branch Experiment Station, Marianna, susceptible varieties were infected to the extent that from 75 to 90% of their leaf surface had been invaded. Even Red Rustproof strains showed signs of infection with typical small rust pustules in varying amounts.

Near Lake Village (Chicot County) a planting of nearly 50 acres, presumably of Forkedeer, showed infection of 100%, and an estimated loss of nearly 50% in yield. The plants were in the milk stage at the time this infection was observed.

Stem rust was observed at Stuttgart, Marianna, Fayetteville, and Lake Village, infection ranging from a trace to approximately 60%. The most severe infection observed was a trial planting at the Rice Branch Experiment Station, Stuttgart, where 60% of the plants of a hybrid were infected.

Helminthosporium leaf blotch was the most prevalent disease of winter oats in Arkansas during this season. It was present in nearly every planting surveyed, and in many instances the lower leaves were destroyed by it. Leaf blotch combined with adverse growing conditions reduced the leaf area considerably in various plantings. This disease was moderate to severe, in most instances, in all of the southern counties surveyed. In a 3-acre

planting near Hamburg (Ashley County), at least 80% of the leaf surface was destroyed by blotch. Considerable loss was sustained in the latter case since the grain was in the milk stage of development. A similar loss occurred in a 5-acre planting (Coker strain) near West Memphis, (Crittenden County); however, the grain was further advanced in development being in the soft dough stage.

Halo blight (Phytomonas [Pseudomonas] coronafaciens) was observed in 2 plantings; in neither instance was it causing an appreciable loss.

Loose smut (Ustilago avenae) and covered smut (Ustilago levis [U. kolleri]. Very few fields were free from smut; however, in most instances the infection was never greater than a trace. In plantings where seed treatment was not practiced infections varied from 5 to 41%. In a trial planting of Lee on the Rice Branch Experiment Station, Stuttgart, 41% of the heads had smut infections, based on a count of 600 heads.

Spring Oats. - Approximately 350 acres were surveyed. Crown rust was present in nearly every field surveyed. The amount of infection varied from a trace to 2% shortly after heading (June 2) and with abundant rains, this disease became abundant and destructive. When plants of susceptible varieties such as Kherson and Markton reached the late milk stage 90% of the leaf area was infected.

Loose and covered smuts were very conspicuous in nearly all of the spring oats surveyed, infection varying from a trace to 20%. For the spring oat crop as a whole the loss in yield from smut was between 5 and 10%.

Halo blight was present in 2 plantings of spring oats in Carroll and Marion Counties. A reduction of 2% of the leaf surface was estimated in 5 acres near Green Forest (Carroll County).

Helminthosporium leaf blotch was general in its distribution throughout the spring oats growing counties. The most severely infected plants were observed near Pyatt (Marion County) where a reduction of at least 25% of the leaf surface was estimated.

Stem rust was present on spring oats at Fayetteville. The loss was negligible at the time of this survey.

Wheat. - Approximately 850 acres were surveyed. Leaf rust (Puccinia rubigo-vera var. tritici), although rather sparse early in the growing season, developed to such an extent that reduction in yield could be expected. In southeastern Arkansas (Chicot, Desha, and Arkansas Counties) leaf rust caused from a trace to 25% reduction in leaf surface. Very little reduction in yield was expected in this area since the grain was in the dough stage. A small planting of the variety Fultz, seeded in September 1943 at the Livestock and Forestry Branch Experiment Station, Batesville (Independence County), showed infection of 100%. The grain was in the soft dough stage. In northwest Arkansas such varieties as Early Ripe, Alabama Blue Stem, Fultz, and Fulcaster, mostly standard varieties for this area, had severe infections of leaf rust. The average, in most instances, would exceed 50% and in some plantings an infection of 85 to 100% occurred. Although most of the plantings were in the early dough stage, some reduction in yield could be assumed with such extreme leaf infections.

Stem rust was observed in plantings in Crawford, Lee, Independence, and Washington Counties. The amount of infection varied from a single pustule, observed in a field near Van Buren (Crawford County), to a localized infection of nearly 50% in one corner of a field at Fayetteville (Washington County). In the latter case the plants were in the milk stage and a reduc-

tion of at least 10% of the yield is anticipated.

Speckled leaf blotch (Septoria tritici) was the most prevalent of all of the diseases of wheat during the early growing season. In most of the plantings surveyed the lower leaves were killed by leaf blotch infections, and in some instances infections were observed on the flag leaves. It is difficult to estimate the percentage of reduction in yield due to this disease; however, when the lower leaves are destroyed and the higher leaves infected a marked reduction in yields is inevitable.

In 2 or 3 plantings in Washington County the lower leaves of most of the plants were affected severely by powdery mildew. These infections became apparent the latter part of May.

Loose smut (Ustilago tritici) infections were observed in several plantings, amounts varying from a trace to 5%.

Black chaff (Phytomonas translucens var. undulosa) [Xanthomonas translucens f. sp. undulosa] was present in one planting near Summers (Washington County) where very little reduction in yield resulted. It was observed on the Main Experiment Station, Fayetteville; however, only a few heads were infected at the time of this survey.

Glumes having symptoms characteristic of glume blotch (Septoria nodorum) were observed. Unlike last year when blotch was abundant on winter wheat, the disease this year was considerably reduced in incidence on winter wheat but spring wheat was heavily infected at the University Farm, Fayetteville.

An occasional plant affected by scab (Gibberella sp.) and anthracnose (Colletotrichum graminicolum) appeared in plantings in northwest Arkansas. In no instance was infection by either greater than a trace.

Rye. - Approximately 450 acres were surveyed. Leaf rust (Puccinia rubigo-vera var. secalis) was moderate to severe in every planting surveyed. In several instances infection occurred rather early in the development of the plants and caused considerable reduction in yields. Common rye, growing on the Rice Branch Experiment Station, Stuttgart, was infected early in its development. Dr. C. Roy Adair in a letter to Dr. H. R. Rosen reported leaf rust on rye, in this planting, as early as March 15. The writer examined the same planting on March 28, before heading, at which time at least 75% of the leaf surface was infected. Examination on May 18 showed numerous plants lodged and a general weakening of the stems due to leaf rust as well as complete defoliation. The varieties Abruzzi and Balboa were also infected with leaf rust but reductions in yields were considerably less than occurred in Common rye. -- Howard W. Larsh, Emergency Plant Disease Prevention Project.

DISEASES OF CEREALS AND GRASSES IN WISCONSIN: Between June 8 and June 16 inclusive, inspection of cereals and forage crops was made in about 14 counties in south-central and eastern Wisconsin in company with Dr. J. G. Dickson. Above-normal rainfall and cloudy humid weather occurred prior to and during the first half of June. Much high or standing water was encountered, especially on clay soils in the eastern district; however, there appeared to be relatively little loss from drowning out.

Barley. - Barley fields were inspected in the 13 counties listed below. For the most part the fields were in the late tillering or early culm elongation stage.

Helminthosporium spot blotch and seedling blight (H. sativum) was present in from a trace to 90% of the fields and was the most common and destructi

disease found on barley. Some fields were strikingly yellowed from the effects of seedling infection. The tabulation gives a summary of the 43 fields examined, and the estimated amounts of infection.

Spot blotch and seedling blight on barley in Wisconsin

County	Number Fields Examined	Estimated amount of Leaf Blotch	Seedling Blight
Rock	3	Trace	Trace
Walworth	2	Trace	Trace to severe
Dane	5	Trace to abundant	1 to 6%
Dodge	2	Trace	10 to 15%
Columbia	2	Trace	5 to 90%
Green Lake	1	Spotty trace to 90%	20%
Fond du Lac	4	2 to 40%	12 to 20%
Calumet	7	Clean to 10%	1 to 25%
Manitowoc	5	Clean to 1%	Trace
Brown	3	Trace to 4%	
Kewaunee	4	Trace to abundant	Trace to 10%
Outagamie	3	Clean	8% to severe
Winnebago	2	Abundant	5 to 30%
13 counties	43	Trace to abundant	Trace to 90%

Pedigree 38 was the common variety encountered; some Oderbrucker was also observed and in a few fields in Calumet and Manitowoc Counties Manchurian was being grown. The Manchurian barley, especially when treated, appeared clean and free from disease. Only one field of Manchurian barley examined showed a trace of leaf blotch.

Farmers, in general, have discontinued treatment of barley seed since the development of stripe-resistant strains, but it is apparent from this survey that the simple seed treatment, especially for Helminthosporium spot blotch, should again be employed.

Net blotch (Pyrenophora teres) was observed in abundance in Walworth County only. Stripe disease (H. gramineum) was observed on the Oderbrucker variety in one field each in Kewaunee and Winnebago Counties, infection in each case being estimated at 5%. On Pedigree 38 a nonparasitic leaf spot was observed in one field in Manitowoc County and on muck soil in Outagamie County.

Corn. - Gibberella zeae was found fruiting abundantly on old overwintered corn stalks in Dan County.

Oats. - A total of 53 oat fields were inspected in 13 counties (Dane, Dodge, Jefferson, Columbia, Rock, Walworth, Fond du Lac, Calumet, Manitowoc, Brown, Kewaunee, Outagamie and Winnebago), the majority appearing to be of the Vicland variety. Most oats were in the late tillering or early culm elongation stages. One field in Columbia County was beginning to head.

Helminthosporium leaf blotch (caused by the conidial stage of Pyrenophora avenae) appeared to be of greatest economic concern, being noted in from a trace to medium amounts in each county visited. The perfect stage of the fungus was collected in several counties on old stubble or straw. With the use of Vicland oats seed treatment has, in general, been abandoned, but it would appear that a simple dust treatment of oats would be worthwhile to control not only this disease but the even more prevalent halo blight.

Halo blight was found present in all but 3 fields examined in from a trace to very abundant infection. In some fields the lesions on the lower leaves were very abundant, in others the plants were outgrowing this stage and the affected leaves had dried up or largely disappeared. The rainy cold weather appears to have favored seedling infection but it is probable losses will not be great and most plants have outgrown or will outgrow the disease. The abundance of the lesions at the time of inspection appears to depend on the lateness of planting and the stage of development of the plants. Crown rust was found on oats in one county (Rock) only and merely as a trace. Early settlers (largely English) in Rock and the eastern part of Green County brought with them shrubs and planted long hedges of Rhammus cathartica. Later they experienced much difficulty in growing oats and about 1916 or a little later most farmers gave up the culture of oats, many substituting barley. Many of these Rhammus hedges and escaped plants are still to be seen in this area. This year, however, with the appearance of the disease-resistant Vicland variety and the economic advantage of growing oats instead of barley, many fields of oats and few fields of barley are being grown in this area. Examination of the Rhammus hedges revealed a scattering of aecia of P. coronata present on the leaves, so that inoculum is available for oat infection in case susceptible varieties are present.

A tip burn or blight was generally observed in Dane County and particularly in Rock County. The symptom associated with this trouble is a whitening, graying, or blighting of the tips in varying degrees, especially on the upper part of the seedlings. It is believed that this is heat injury associated with the succulent growth resulting from the excessive moisture.

Wheat. - Some spring but mostly winter wheat was inspected in 5 counties (Dane, Calumet, Manitowoc, Kewaunee, and Outagamie). The variety mostly encountered was Wisconsin Pedigree 2 which was at heading stage at the time of the inspection. Leaf rust was observed on winter wheat only as a trace in Dane, Calumet, Kewaunee, and Outagamie Counties. Aecia on the lower leaves of the tall meadow rue, Thalictrum polygamum, were observed in Rock and Dane Counties. It was probably a little late to find aecia at the time of inspection. Helminthosporium blight was observed in small amounts on spring wheat in Dane County. Loose smut was found as a trace in Manitowoc, Kewaunee, and Outagamie Counties, and up to 2% in Dane and Calumet Counties. Powdery mildew was observed as a trace on the lower leaves in Calumet and Manitowoc Counties, and was rather abundant in Kewaunee County. Speckled leaf blotch was observed only as a trace in winter wheat in Dane County. Winter injury was observed in one 50-acre field in Outagamie County where 40 to 50% of the plants had been injured.

Rye. - Rye fields were inspected in Rock, Green Lake, and Columbia Counties. Rye was headed out and well toward maturity. Leaf rust was found in amounts from a trace to 20% in Green Lake County; abundant in Rock County; but not present in fields examined in Columbia County. Septoria leaf blotch (S. secalis) was abundant in Rock County, and occurred in amounts from a trace to 25% in Green Lake County. Powdery mildew on rye in Rock County, and ergot (Claviceps purpurea) in Columbia County, were found only as traces.

Timothy. - In an old field of timothy examined in Calumet County, leaf or stripe smut (Ustilago striaeformis) and brown leaf stripe (Scolecotrichum graminis) were found present in small amounts. The stripe smut

was not observed in younger timothy-clover or timothy-alfalfa meadows.

Other Grasses. - Crown rust was observed on Calamagrostis canadensis in Dane County; tar spot (Phyllachora graminis), spot blotch (Helminthosporium sativum), and bacterial leaf blight (Phytomonas [Xanthomonas] translucens) on quack grass, Agropyron repens, in Dodge County; Helminthosporium leaf spot (H. sativum) on squirrel-tail grass, Hordeum jubatum, in Calumet County; an undetermined leaf spot on Koeleria cristata in Winnebago County; heavy infection by stripe smut (Ustilago longissima) on reed meadow grass, Glyceria grandis, in Kewaunee and Marquette Counties. -- Edwin E. Honey, Emergency Plant Disease Prevention Project.

DISEASES OF SMALL GRAINS IN MINNESOTA AND THE DAKOTAS: Small grains were examined from Fargo to Jamestown to Ellendale, North Dakota, to Aberdeen and Brookings, South Dakota and across southern Minnesota from Luverne to Albert Lea and north to St. Paul.

Wheat. - On June 26 most wheat fields between Fargo and Ellendale were in the boot to heading. Stem rust was not observed in any field, while a light leaf rust infection was found on Thatcher wheat. Most fields were free from leaf diseases. Leaf rust increased in severity in South Dakota but no heavy infection was seen. In one field of Ceres wheat near Aberdeen, South Dakota, 2% loose smut was found. In Minnesota, little wheat was seen except near Pipestone, only one wheat field being examined between Luverne and Albert Lea. This field of winter wheat was very heavily infected with leaf rust, only the flag leaf remaining partly green. Between Faribault and St. Paul several fields of Rival wheat were found to be infected with stem rust, the prevalence being about 10%. The pustules, just breaking through the epidermis, were relatively few in number but were scattered on the internodes.

Barley. - Almost all fields of barley in south-central and eastern North Dakota and in north-central and eastern South Dakota were infected with net blotch (Helminthosporium teres). Highest infections were seen in the Red River Valley.

Loose smut, which was found generally in the Red River Valley, decreased in prevalence westwards in North Dakota. Most fields had at least a trace of loose smut and no field examined had above 3% infected heads. In South Dakota, loose smut was not heavy, an average infection of 1% being found.

At St. Paul and Waseca, Minnesota very heavy infection of bacterial blight (Phytomonas [Xanthomonas] translucens) has occurred on many barley varieties in experimental plantings. At St. Paul heavy infection of spot blotch also was found.

Oats. - Crown rust of oats is widely distributed but of relatively light severity from the Red River Valley west to Jamestown, and south and east from there. No crown rust was seen on any of the newer resistant oats (Vicland, Tama, etc.).

Rye. - J. J. Christensen and M. B. Moore of the University of Minnesota reported very heavy infection of anthracnose (Colletotrichum graminicolum) causing severe kernel blight on rye at the Experiment Stations at Waseca and St. Paul. Scab (Gibberella saubinetii) [G. zeae] also was causing some damage at Waseca. Loss from anthracnose in one rye field at St. Paul was estimated to be 20%. A survey of rye fields in Ramsey, Washington, and Anoka Counties failed to disclose any case of severe loss from anthracnose.

Infected spikelets were found in all fields. One field was suffering a loss of 5% from a combination of anthracnose, scab, and ergot, but in other fields the loss was lighter, not exceeding 2% at the time of examination (July 2). — Ian W. Tervet, Emergency Plant Disease Prevention Project.

DISEASES ON SMALL GRAINS AND GRASSES IN IOWA: In company with Dr. H. C. Murphy, Dr. G. C. Kent and Prof. L. C. Burnett, community grain trials and farms lying in Crawford, Harrison, Pottawattamie, Mills, Fremont, Page, Adams and Union Counties were visited and disease data collected during the period ending June 26. This is, in part, a continuation of the report of June 19.

Oats. - Crown and stem rusts of oats were collected in every farm and nursery visited. Crown rust was especially heavy on Gopher and Marion in the nurseries. Little was found in the fields as most of the farmers are planting resistant varieties. Flecking was found on all varieties showing resistant reaction to the rust.

Stem rust was found in all localities from a trace in the fields to as much as 10% in the nursery rows. Gopher oats was most severely infected although Osago and Boone were also found bearing typical pustules. Boone oats in fields in Crawford and Page Counties were infected. In a 40-acre field of Boone in Page County the infection was evidently of older duration than infections on Gopher oats in a nearby nursery.

All fields of oats examined contained scabby kernels from a trace to 5 to 10%. Anthracnose was discovered on oats at Logan, Iowa by Dr. Kent. Later it was found rather generally scattered over fields and nurseries, from a trace to 2 to 3%. Halo blight was found on all varieties in all sections, but, as previously stated, it is most severe on Boone. Helminthosporium leaf spot was found widespread but of minor importance in the southwestern counties.

Wheat. - Leaf rust was found in all localities. It occurred in all nurseries and fields of Ioturk and Iowin, infection varying from a trace to as much as 20%. In general, however, it does not appear to be doing much damage as the wheat is rapidly nearing maturity.

Stem rust was found in all localities. From a trace to 25% was found in a field of Ioturk wheat in Adams County.

Scab was present in all fields in amounts from a trace to as much as 20%. In fact, scab appeared to be the most serious disease encountered on wheat.

An infection of the joints, caused by Septoria nodorum, was found in all fields, from a trace to as much as 10%.

Black chaff was found on one 80-acre field of wheat in Fremont County where fully 100% of the leaves bore typical infections. Many of the glumes and awns were also infected.

Rye. - Leaf rust was present in all fields of rye seen and in some cases as much as 40% of the leaf area was infected.

Ergot was found on all rye seen, varying from a single sclerotium to several sclerotia on a spike.

Brome Grass. - Ergot was also found on brome grass in the southwest counties. Chocolate spot (Pseudomonas coronafaciens var. atropurpurea) was found in Page County as a trace. -- Edgar F. Vestal, Emergency Plant Disease Prevention Project.

DISEASES OBSERVED ON WHEAT AND OATS IN MISSOURI: During the week ending July 1, a continuation of the small grain survey was made into the east-central portion of Missouri where a considerable acreage is planted to winter wheat and oats.

Wheat. - The crop in this section of the State is mature and over 90% of the fields have been harvested. Examination of uncut fields, and wheat that was cut and in shocks revealed the presence of stem rust in every instance. In general the prevalence approached 100%, although an occasional field showed a lower percentage of plants infected. The severity of infection ranged from a trace to as much as 50% in one field, averaging about 5%. Except for the single, heavily infected field noted, the grains appeared to be well filled and the probability is that stem rust, although prevalent, has caused relatively little damage to the wheat this season. Leaf rust was observed in all fields, with an approximate prevalence of 100% and an average severity of about 15%. Barren inflorescences, indicative of loose smut infection, were noted in practically every field. The percentage of such plants ranged from 1 to 20, averaging approximately 10%. Scab appeared to be more serious in this area than in the other sections of the State. The number of infected heads ranged from a trace to 20%, averaging 7.5%. Glume blotch was observed in the majority of fields. From a trace to 60% of the heads showed infections; however, it is unlikely that much damage has resulted, except, perhaps, in the fields where infection was unusually severe.

Oats. - The oats were maturing rapidly because of the hot, dry weather. Many early-sown fields had been cut. However, late-planted fields, ranging from the boot to milk stage of development, were not uncommon. Stem rust was found in all fields. The prevalence ranged from a trace to 100% and the average severity amounted to about 1%. The prevalence of crown rust approached 100%, the severity ranging from a trace to 75%, averaging approximately 5%. Stem rust and crown rust do not appear to have been particularly damaging to the early-sown oats, but it seems quite possible that some damage will result in the late-planted fields, particularly from crown rust. Loose smut was found in more than 90% of the fields. From a trace to 10% of the heads were affected, the average being about 3%. One field was observed in which approximately 2% of the heads were infected with covered smut. Blast (non-parasitic) was observed in about 50% of the fields, the damage amounting to a trace. In general, the leaf spots other than rust were difficult to detect because of the condition of the foliage. However it appeared that Helminthosporium sp. (probably avenae) was prevalent but no longer active, in most of the fields, and about 1/3 of the fields showed a trace of halo blight infection. -- T. W. Bretz, Emergency Plant Disease Prevention Project.

YELLOW SPOT ON WHEAT, AND OTHER DISEASES ON WHEAT AND OATS IN KANSAS: Frequent heavy showers and rains have continued over much of Kansas for the past 10 days to 2 weeks. Heavy rains have fallen in many localities, especially in the southwestern part of the State. The showers and rains have been accompanied by higher temperature. This has resulted in much hot, humid weather extremely favorable for the development of rusts. All cereal rusts have increased greatly in the past week and damage to wheat and oats will be heavy in some places.

Leaf rust of wheat was late in development and is extremely heavy only in fields of heavy wheat in the central part of the State. In southern counties wheat harvest has started and rust infection is very light. In the southeastern part, as far north as the Kaw River Valley, both leaf rust and stem rust can be found in every field of wheat and oats, but wheat is ripening and will escape damage. Oats could still be damaged but most fields are thin and poor so losses due to rust will be low.

On a recent trip through the central and southeastern part of the State, the writer was surprised to find a considerable acreage of good oats in central Kansas where the oat acreage usually is low. Some of the better fields already were heavily infected with both crown and stem rusts and obviously will be destroyed before maturity since the grain was only in the milk stage. Fulton and Kanota both were generously infected with stem rust while new resistant selections such as Ventura, Boone, Osage, and CI 4141 growing in experimental plots or increase fields had only occasional small infection centers. Obviously most of the inoculum is physiologic race 2 or 5 with only a light sprinkling of race 8 or 10.

Early varieties of winter wheat in the vicinity of Manhattan are beginning to ripen and heavy infection of both leaf and stem rust have developed in the last 10 days. Most commercial wheat is too far advanced to be seriously hurt, but a large crop of urediospores is being produced for distribution to late wheat farther north and west. Reports from the western half of the State have indicated only light infections of leaf rust and bare traces of stem rust. At present the only part of the State where severe damage from rust seems likely is in a large area of very late wheat in north-central counties and possibly in some very rank wheat in extreme northwestern counties. Neither possibility is a fact as yet. At Manhattan a single overwintered infection center of stem rust was found at the Agronomy Farm on June 2 but infection has become generally heavy within the past few days.

One interesting disease feature here this year has been the appearance of a yellow leaf spot on wheat. The causal organism was identified by A. G. Johnson as Helminthosporium tritici-vulgaris. It was abundant on winter wheat at Manhattan and in adjoining counties. Speckled leaf blotch caused by Septoria tritici also is very abundant on Kansas wheat this year. -- C. O. Johnston, Division of Cereals Crops and Diseases. June 16.

STEM RUST AND OTHER DISEASES IN WESTERN KANSAS AND EASTERN COLORADO: During the period ending June 24 plant disease surveys in southeastern Colorado and western Kansas were made in company with Mr. E. A. Lungren, Associate Pathologist, Barberry Eradication, Bureau of Entomology and Plant Quarantine.

Stem Rust Survey in Eastern Colorado and Western Kansas. - A trace/severity and trace/prevalence of stem rust was found in most of the wheat fields examined in Bent, Otero, and Prowers Counties. In Otero County a trace/severity and trace/prevalence stem rust was found on barley. Leaf rust was found ranging from trace to 10%/severity and trace to 100%/prevalence. Weather conditions in this section of Colorado have been dry and the temperature has been up to 103° F with hot dry winds. It is unlikely there will be any appreciable rust damage in the southeastern Colorado Counties unless in some of the late fields.

In the vicinity of Garden City, Kansas in Finney County, stem rust on

winter wheat ranged from 5 to 10% severity and 20 to 80% prevalence. It is unlikely that any damage will result since it is about one week from harvest.

In the territory north of Garden City to Colby, Kansas, stem rust could be found in all fields, ranging from a trace to 5% severity and from a trace to 40% prevalence. There was more leaf rust on wheat in Kansas than was found in Colorado, severity ranging from 10 to 70% with 100% prevalence. With grain about 2 weeks later than last season, rust damage will depend on weather conditions within the next 2 weeks.

Westward from Kansas to Burlington, Colorado in Kit Carson County the stem rust diminished. Here only a trace/severity and trace/prevalence of stem rust was found. North of Burlington to Wray, Colorado in Yuma County a trace of stem rust was found in all fields examined. Winter wheat is fair to good in this area although about 2 weeks later than last year. Depending on the weather conditions there may be some stem rust damage in this area.

In Phillips County in the vicinity of Holyoke, Colorado considerable more stem rust was encountered. Prevalence in winter wheat was 100% and severity 10%. This condition was found to be general in almost all the fields for a distance of about 10 miles around Holyoke, which might indicate the presence of barberry in this vicinity. While in this area a survey was made of the city of Holyoke and a number of farms surrounding, but no bushes were found.

Stem rust decreased westward from Holyoke and traces were found on both spring and winter wheat in Logan and Weld Counties.

A slight amount of leaf rust was found in all wheat fields in Kit Carson, Yuma, Phillips, Logan, Morgan, and Weld Counties.

Other Cereal Diseases in Colorado. - Speckled leaf blotch was found in all wheat fields examined in Colorado. The heaviest infection, ranging from 50 to 100%, was found in Otero, Bent, and Prowers Counties. It is unlikely that any appreciable amount of damage will result. A trace of loose smut of wheat was found in all fields examined. Loose smut of barley was found in all fields surveyed. The heaviest infection was recorded in Pueblo County on the Lico variety. Here 5 to 8% of the heads were smutted. Stripe disease of barley was found to be present in a slight amount in all fields visited. Net blotch was found in small amounts in a few of the fields in Otero, Prowers, and Bent Counties. Powdery mildew was only found on winter barley at the Colorado Experiment Substation at Rocky Ford, Colorado.

A trace of leaf rust of rye was found in one field in Phillips County. Considerable hail damage to all grains was noted in Kit Carson and Yuma Counties. -- E. W. Bodine, Emergency Plant Disease Prevention Project.

DISEASES OF WHEAT AND BARLEY IN SOUTHEASTERN WYOMING: During the period ending July 1, a survey was made in southeastern Wyoming, in company with Mr. E. A. Lungren, of the Bureau of Entomology and Plant Quarantine.

Stem rust of wheat was not found in the irrigated section in the vicinity of Wheatland in Platte County. A trace/severity and trace/prevalence was found on winter wheat, spring wheat, and barley in Goshen County. In Laramie County a trace was found on winter wheat.

A trace of leaf rust was found in all wheat fields examined in Platte, Goshen, and Laramie Counties.

A trace of loose smut was found in most wheat fields examined in southeastern Wyoming. Speckled leaf blotch was observed in all wheat fields surveyed; most of the fields showed only a slight amount but infection was heavy in 2 fields south of Hawk Springs in Goshen County.

Barley loose smut was found only in a few fields in Goshen County. Only a trace of stripe was noted in barley fields examined. -- E. J. Bodine, Emergency Plant Disease Prevention Project.

OAT SMUT AND WHEAT LEAF RUST IN WESTERN MONTANA: Covered smut had destroyed 10% of the heads in an oat field near De Smet; and many wheat fields inspected north of Flathead Lake showed leaf rust but damage was negligible. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending June 24.

SCLEROTINIA SCLEROTIORUM ON FLAX IN CALIFORNIA: Field Representatives of the California Central Fibre Corporation, El Centro, California, observed a disease on flax near Holtville, California, during the summer of 1943. Since lodging of affected plants in patches and browning and breaking of stems constituted the most obvious symptoms, the disease was tentatively diagnosed in the State as "stem break," caused by the well-known Polyspora lini Lafferty. Detailed studies carried out through The Plant Research Laboratory of California Central Fibre Corporation in North Carolina have proved that Sclerotinia sclerotiorum (Lib.) Massee was the primary cause. This causal pathogen was identified by Dr. F. A. Wolf of Duke University. Apparently the only previous records of this sclerotial disease of flax within the United States are those recently reported by Pady (PDR 28(4/5):167. Feb.15/Mar.1; (6):186. Mar. 15, 1944). The fungus has been reported to occur on flax in Ireland and in Russia.

Sclerotinia sclerotiorum is quite widely distributed throughout the world and is pathogenic on many species of cultivated and wild plants. Fibre from California seed flax straw is being utilized in the manufacture of cigarette paper. In view of this fact and of the destructiveness of this disease, a detailed study of it and of S. sclerotiorum has been made, and will be published at an early date. -- H. P. Vannah, Director of Plant Research Department, California Central Fibre Corporation.

REPORTS ON DISEASES OF LEGUMES

DISEASES OF ALFALFA IN WISCONSIN: Between June 8 and June 16 inspection of cereals and forage crops was made in south-central and eastern Wisconsin. Above-normal rainfall and cloudy humid weather occurred prior to and during the first half of June. Much high or standing water was encountered especially on clay soils in the eastern district; however, there appeared to be relatively little loss from drowning out. Notwithstanding the open winter forage crops appeared in most cases to have come through in fair to good condition.

Alfalfa. - Alfalfa fields examined in 7 counties (Dane, Rock, Walworth, Columbia, Green Lake, Calumet, and Outagamie) revealed the following diseases:

White spot believed to result from physiogenic causes and probably related in part to moderate winter injury of root and the recent frequent rains, was found in several locations in Dane County. Pseudopeziza leaf

spot (P. medicaginis) was found present in all 7 counties inspected and was medium to severe in fields examined in Rock, Columbia and Green Lake Counties. Pyrenopeziza leaf blotch (P. medicaginis) was abundant and very severe in some fields in Dane, Columbia and Green Lake Counties. A bunchy top disease with symptoms of some yellowing and shortening especially of terminal internodes was found present in Calumet and Outagamie Counties. Dr. F. R. Jones has noted the failure of alfalfa to blossom with the terminal internodes fore-shortened in many fields in the Dodge-Fond du Lac County areas. Adjacent to such fields roadside alfalfa was frequently found in blossom and such blossoming appeared to coincide with areas burned over by the Highway Commission men. Because of the abundant association of spittlebugs with the non-blossoming alfalfa and the lack of it on the roadside this failure to blossom and terminal distortion may be associated with spittle-bug injury. Winter Injury is chiefly apparent in the sandy soil areas, whereas, on heavier soils relatively little winter injury is evident. -- Edwin E. Honey, Emergency Plant Disease Prevention Project.

ALFALFA LEAF SPOT IN EAST-CENTRAL MISSOURI: A number of alfalfa fields were examined, which, from a distance, showed considerable yellowing of the foliage. Examination revealed that Pseudopeziza leaf spot was prevalent on the affected leaves. -- T. W. Bretz, Emergency Plant Disease Prevention Project. Week ending July 1.

ALFALFA DISEASES IN WESTERN MONTANA: Areas not previously visited in northwestern Montana were surveyed during the week ending June 24. Leaf blotch was found in 9 fields of alfalfa in the Flathead Lake district and in 3 fields in the Conrad district. Downy mildew (Peronospora trifoliorum) was seen in 3 fields in the Flathead Lake district and in one field in the Conrad district. Bacterial wilt (Corynebacterium insidiosum) was seen in 5 fields in the Flathead Lake district (between Arlee and Polson) and in one field 9 miles west of Cutbank. Wilt was not found around the north end of Flathead Lake.

Further examinations were made of the dwarfing and yellowing of alfalfa previously noted in the shallow gravelly soils of the western slopes of the Bitterroot Valley. Considerable reddening, bronzing, and dessication of the tops were also to be seen on affected plants. Pending further investigation, this condition is tentatively diagnosed as a boron deficiency disease. -- C. M. Slagg, Emergency Plant Disease Prevention Project.

ALFALFA DISEASES IN WYOMING AND COLORADO: Blackstem (Phoma medicaginis) was found to be widespread in southeastern Wyoming during the week ending July 1. Leaf infection was heavy in several fields south of Wheatland in Platte County. In these fields the first cutting of hay will be slightly damaged. Only a light infection was noted in the other areas surveyed. A trace of downy mildew was found south of Torrington in Goshen County.

Blackstem was found in all alfalfa fields examined in eastern Colorado during the week ending June 24. -- E. W. Bodine, Emergency Plant Disease Prevention Project.

DISEASES ON RED CLOVER IN WISCONSIN: Fields of red clover were inspected in 7 counties (Dane, Dodge, Jefferson, Rock, Green Lake, Kewaunee, and Outagamie). Stemphylium leaf spot (S. sarcinaeforme) was the chief disease observed in all counties. It was found occurring abundantly in Dane, Dodge,

Rock, and Kewaunee Counties, and in amounts from a trace to medium in Jefferson, Green Lake, and Outagamie Counties. Northern anthracnose (Kabatiella caulivora) was found as a trace in only 4 fields in Jefferson and Green Lake Counties. This disease appears to occur in spots and chiefly only in traces this year, in spite of the fact that the weather appears to have been very favorable for its development.

The fields observed were noticeably free from powdery mildew (Erysiphe polygoni). -- Edwin E. Honey, Emergency Plant Disease Prevention Project. June 8 - 16.

RED CLOVER DISEASES IN MINNESOTA: Northern anthracnose was found to be present generally on red clover north of St. Paul. Macrosporium [Stemphylium] leaf spot was found less frequently. Powdery mildew was found infrequently. -- Ian W. Tervet, Emergency Plant Disease Prevention Project. Week ending July 2.

RED CLOVER DISEASES IN WESTERN MONTANA: Powdery mildew was found in 2 fields near Flathead Lake. Sooty blotch (Dothidella [Cymadothea] trifolii) was found causing serious damage in one field along the eastern shore of Flathead Lake. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending June 24.

WILDFIRE AND OTHER DISEASES ON SOYBEAN IN LOUISIANA: In the report for the week of May 29 - June 3 (PDR, June 7) 2 diseases of soybean were described but the causal agents had not been determined. Specimens were sent to Dr. Leland Shanor and referred by him to Dr. W. B. Allington of the Division of Forage Crops and Diseases. Dr. Allington determined the second disease described (l.c.) as a new disease on soybean that is attracting much attention at the present time. According to Dr. Shanor, transmitting Dr. Allington's identification, "It apparently is caused by the same bacterium that is responsible for wildfire of tobacco and by some is considered probably one of the most serious diseases of soybean that we have at the present time. Dr. Allington has had specimens of this sent in to him from widely separated localities." This, then, apparently is the first report of wildfire on soybeans in Louisiana. The disease has been found only in one location (near Bunkie in Avoyelles Parish) and appeared to be severe at the time it was observed. As far as is known, no tobacco is grown near Bunkie. Perique tobacco (about 50 acres) is grown about 150 miles from Bunkie (at Grand Point, St. James Parish), but there has been no wildfire on tobacco there this year as yet.

The other (first) undetermined disease described (l.c.) has not yet been identified.

Stem blight (Diaporthe sojae) and charcoal rot (Sclerotium bataticola) were found in fields of soybeans in Assumption Parish. Damage was evident but not serious. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. June 26 - 30.

BROWN SPOT ON SOYBEAN IN WISCONSIN: In Dane County, on some volunteer plants of soybean at the University Farm, the brown spot disease caused by Septoria glycines has been found. This is the first report of this disease for Wisconsin. -- Edwin E. Honey, Emergency Plant Disease Prevention Project. June 8 - 16.

DAMPING-OFF AND BACTERIAL BLIGHT OF SOYBEANS IN EAST-CENTRAL MISSOURI: A number of soybean fields were examined, and in general the stands appeared to be good, although some damping-off had occurred in every field. Owing to the density of the stands, however, it is doubtful that the damping-off will be a factor in determining the final yields. A trace of bacterial blight (Pseudomonas glycinea) was noted on a few leaflets of a few scattered plants in most of the fields. -- T. W. Bretz, Emergency Plant Disease Prevention Project. Week ending July 1.

SWEETCLOVER DISEASES OBSERVED IN WISCONSIN: Sweetclover fields were examined in Rock, Walworth, Manitowoc, and Outagamie Counties. Stagonospora leaf spot caused by the conidial stage of Leptosphaeria pratensis was observed only in Walworth County in slight amounts. A root rot believed to be caused by a species of Phytophthora was observed as a trace in 3 fields in Manitowoc and Outagamie Counties. Yellows caused by a virus was found in small amounts in one field each in Rock County and Outagamie County. The bunchy top condition resulting from a shortening of the upper internodes was fairly prevalent. -- Edwin E. Honey, Emergency Plant Disease Prevention Project. June 8 - 16.

CONTROL OF POTATO LATE BLIGHT IN LOWER RIO GRANDE VALLEY WITH AN ORGANIC FUNGICIDE PLUS ZINC SULFATE AND LIME

G. H. Godfrey

In view of the current interest in newly developed organic fungicides, brought about in part by a threatened shortage of copper for agricultural application, a test was conducted in the Lower Rio Grande Valley of Texas, using one of these materials in comparison with certain standard fungicides used most extensively in that region. The organic material used was the Rohm and Haas product, disodium ethylene bisdithiocarbamate, designated as He-175 and more recently as "Dithane", with and without added zinc salts, and in some cases, lime. The combination with zinc sulfate and lime had already shown superior results in the control of early blight [Alternaria solani] of potatoes in Delaware (Heuberger and Manns, Del. Agr. Exp. Sta. Pamph. No. 10, Jan. 1944). A report on outstanding control of potato late blight [Phytophthora infestans] in Florida in the spring of 1944, has recently appeared (Ruehle, PDR, April 1, 1944).

The South-Texas test was conducted under conditions that were highly favorable for obtaining results. Late blight was already present in the isolated field chosen for the test, and blight-favorable conditions continued through the growing season. Several different combinations of organic and inorganic materials were used, in both spray and dust form. All materials were applied in duplicated randomized plots consisting mostly of 2 rows 90 feet long. Hand sprayers and dusters were used and sufficient material to obtain efficient coverage was applied in all treatments. Four applications were made; the first on March 7; the others at 5 to 8 day intervals thereafter. The plots were harvested April 7 and 8.

During the period between the first application and harvest, evidence of the value of some of the fungicidal applications became increasingly apparent. The week before harvest the main part of the field, non-treated,

was entirely brown and the plants dead. The best of the treated plots, in striking contrast, remained almost entirely green. In certain less efficient treatments the plots were intermediate in color.

Yield records were taken by weighing total yields from 50 hills selected at random from each plot, care being taken, however, to avoid hills adjacent to blank spaces. In transforming these yield records to terms of bushels per acre an arbitrary reduction of 10% was made, to allow for failure to get perfect stands. In analyzing the results, the Analysis of Variance method was used. As there were only 2 replications of each treatment, the least difference required for significance was rather high.

Results of fungicidal applications for late blight control on potatoes in the Lower Rio Grande Valley.

	Treatment No.	Formula*	Yield per acre bushels**
SPRAYS	1	Dithane, zinc sulfate, lime 2-1-1/2	242
	2	" 1 1/2-1-1/2	239
	3	Yellow Cuprocide 1 1/2	213
	4	Dithane, zinc sulfate, lime 1-1-1/2	210
	5	Dithane, zinc oxide 2-1/2	195
	6	Dithane, zinc oxide 1 1/2-1/2	187
	7	Dithane, zinc oxide 1-1/2	182
	8	Check	80.2
DUSTS	9	Yellow Cuprocide, Pyrophyllite 5-95	217
	10	Tribasic copper sulfate, Pyrophyllite 12-88	198
	11	Dithane, Pyrophyllite 4-96	135
	12	Dithane, zinc oxide, Pyrophyllite 4-1 1/2-94.5	133
	13	Dithane, Pyrophyllite 5-95	126
	14	Check	108.7

* For sprays, the figures represent pounds per 100 gal. water; for dusts, lbs. per 100 lb. of the mixture.

**Calculated least significant difference, 39.7 bus.

All sprays and dusts down to treatment No. 10 gave yields significantly higher than the controls. The first 2 Dithane zinc sulfate lime sprays were significantly higher than the basic copper sulfate dust and the Dithane zinc oxide sprays and dusts. The 2 copper dusts were significantly higher than any of the Dithane dusts. The Dithane dusts, however, gave distinct benefit, as the plants remained green longer than the controls, and the yields were significantly higher than one of the controls. As the highest yielding control was very near to some of the dusted rows and as it remained green longer than the other control plot, it is very possible that there was some benefit to this control plot due to drifting of the dust.

The conclusion can be drawn from this test that an organic fungicide with a very small quantity of added zinc sulfate, is capable of giving good con-

trol of potato late blight. In the event of a serious shortage of copper for fungicidal application, it would appear that the requirements of the potato grower for an efficient fungicide can be met by the use of an organic fungicide in spray form. Acknowledgment is made of the assistance of Dr. E. M. Swisher of the Rohm and Haas Company in conducting this experiment.

TEXAS AGRICULTURAL EXPERIMENT STATION, LOWER RIO GRANDE VALLEY SUBSTATION, WESLACO

POTATO LIGHT BLIGHT APPEARING IN UP-STATE NEW YORK, PENNSYLVANIA, AND IOWA FIELDS, AND OTHER REPORTS ON POTATO DISEASES

EARLY APPEARANCE OF LATE BLIGHT IN UP-STATE NEW YORK FIELDS: Late blight [Phytophthora infestans] was found on June 29 in a potato field near Ithaca. One plant showed the stem badly diseased, the fungus having apparently worked up from the seedpiece which had been destroyed. This plant also showed several lesions on leaves, separated from the original infection. The adjoining plant also showed blight which had killed the growing tip and several leaves, and 3 spots of blight were found on other plants within 4 feet.

Prior to the hot spell of June 28 and 29 weather has been unusually favorable for late blight and it is not surprising to find it early. It is seldom seen up-state before July 15 and often not until August 20. -- K. H. Fernow, Weekly News Letter, July 3.

LATE BLIGHT ON LONG ISLAND: On the South Fork of Suffolk County, after a rainy period last week and temperatures favorable for the development of late blight, the weather turned warm and clear for the week of June 26. The lowest night temperature recorded was 58°. Although late blight has been observed in this vicinity it is as yet difficult to find in most fields. -- C. H. Wright, Weekly News Letter, July 3.

POTATO LATE BLIGHT IN PENNSYLVANIA: The first occurrence of late blight of potatoes in Pennsylvania was noted June 29 in Lancaster County. Weather was extremely warm and the disease was not spreading rapidly. However, spores were present and active. -- O. D. Burke, Pennsylvania State College. July 1.

LATE BLIGHT IN THE FIELD IN IOWA: Drs. Kent, Hooker, and Vestal report the late blight organism fruiting in the field at Fertile, Iowa. -- I. E. Melhus, Letter to members of Late Blight Committee, Upper Mississippi Valley Plant Pathologists. July 1.

OTHER REPORTS ON LATE BLIGHT: In Minnesota late blight continues to be observed on potato dumps, but none has yet been found in fields, according to C. J. Eide as quoted by I. E. Melhus, "On June 26 we observed late blight on a potato dump near Dilworth. A considerable number of fields in the western and northern parts of the State were observed but no blight has been seen in the fields".

Ian W. Tervet reports (July 2) that late blight was not observed on any potatoes in the Red River Valley of Minnesota and North Dakota, or in eastern South Dakota.

In Colorado, E. W. Bodine reports that potato cull piles were examined for late blight in the vicinities of Windsor, Lucerne, Kersey, and Severance in Weld County. No evidence of the disease was seen on the plants at that time (week ending July 1).

POTATO DISEASES IN NEW YORK: Some bacterial ringrot [Corynebacterium sepedonicum] is appearing in potato fields in Chemung County grown from seed known to be infected, according to L. H. Woodward. C. M. Wright reports that early blight [Alternaria solani] has been seen in all fields visited on the South Fork of Suffolk County on Long Island. -- Reports from Weekly News Letter, July 3.

POTATO DISEASES IN SOUTHEASTERN IOWA: Potatoes in fields and gardens were examined in all localities visited (see Iowa cereal disease report above) and the diseases recorded. No late blight was observed but the virus diseases, rugose mosaic and spindle tuber, were present in every locality. Rugose mosaic was especially severe in some fields. In one case, fully 50% of the plants were infected. Rhizoctonia [solani] was present also although the percentage was not determined. -- Edgar F. Vestal, Emergency Plant Disease Prevention Project.

POTATO DISEASES IN EASTERN COLORADO: A slight amount of blackleg (Erwinia phytophthora) was found in some of the fields in Otero County. The highest amount of infection noted was 1%. Bacterial ringrot was not evident at this time of the season. -- E. W. Bodine, Emergency Plant Disease Prevention Project. Week ending June 24.

TOMATO DISEASE SURVEY IN CENTRAL CALIFORNIA

Horace L. Barnett

Most of the time spent in the field during the period June 18 to 30, was devoted to a survey of tomato diseases in certain parts of Central California. This was intended more as a preliminary survey early in the season. A more extensive and thorough survey of the entire tomato-growing sections of Central California is planned later in the season. At this time the earlier field tomatoes were in bloom with an occasional fruit set on. Many of the later plantings had been in the field only a short time and were just beginning to put out new growth. Little or no disease was found in these later plantings at this time. Green wrap fruit was being harvested and shipped from the Merced district.

Curly top (virus) was prevalent and commonly found in most of the areas surveyed. The severity of infection varied in the different districts. No curly top was found in the relatively few fields in the vicinities of Walnut Creek, Danville, and Dublin. A trace of curly top was present in the vicinity of Livermore. In the vicinity of Centerville and Irvington there was only a small amount of curly top, varying from none to 3%. In the area from Tracy to Vernalis curly top infection was light (1 to 2%) except in one field of pear tomatoes where the infection reached approximately 10%. In the vicinity of Merced the plants infected with curly top ranged from 5 to 10% in both the staked and unstaked plantings.

The most severe infection of spotted wilt (virus) observed this season was near Mt. Eden already reported (PDR, June 22). In other fields in the general area of Irvington, Centerville, Mt. Eden, Alvaredo, and San Lorenzo, infection ranged from none to 15%. The heavier infections were in the Alvaredo-Mt. Eden sections. Traces of spotted wilt were found near Walnut Creek and near Vernalis.

Mosaic (virus) was found in most fields inspected, varying from a trace to 20%.

Bacterial canker (Phytomonas michiganensis) [Corynebacterium michiganense] was more commonly encountered than expected in the areas surveyed. The earliest outbreak occurred near San Lorenzo in Alameda County. It was first called to the attention of Dr. M. W. Gardner, who found the disease in the plant beds from which these plants had been pulled. In this 30-acre field approximately 20% of the plants were infected with bacterial canker. To date this is the only field in the coastal area in which bacterial canker has been found this season. Bacterial canker was found in 6 fields in the interior districts. Traces of the disease were found in one field near Livermore and in 2 fields in the Tracy-Vernalis area. The disease was more severe in 2 fields in the latter area. In one of these fields 8 rows across the field showed approximately 75% infection. Scattered infected plants were found in other parts of the field. No information regarding the source of the plants or seed could be obtained at this time. A second field in this area showed approximately 10% infected plants in one part of the field with scattered infected plants in other parts of the field. Bacterial canker was found in one plot of staked tomatoes near Merced. Approximately 20% of the plants were infected and showed wilting. Here, the plants had recently been pruned. It is likely that this pruning has further spread the disease.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

OTHER REPORTS ON TOMATO DISEASES, AND REPORTS ON DISEASES OF OTHER VEGETABLE CROPS

DISEASES OF TOMATO, EGGPLANT, AND PEPPER IN SOUTHERN LOUISIANA: Early blight (Alternaria solani) has been severe on leaves of tomatoes throughout the southern part of the State. Fruit rots (Colletotrichum phomoides and probably Phoma destructiva) were in evidence on unpicked fruits in the New Orleans and Houma areas. Sunscald was also evident. Leaf mold (Cladosporium fulvum) was noted in considerable amounts at Houma.

In the large pepper areas in St. Bernard, Plaquemines, and St. James Parishes, from 1 to 10% of the Bell pepper plants were attacked by southern wilt (Sclerotium rolfsii). Sunscald had severely damaged a large percentage of the fruits.

In 2 eggplant fields of 2 acres each near Dalcour in Plaquemines Parish, about 5% of the plants were dead or dying. Sclerotium rolfsii was recovered from rotting stems and roots. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. June 26 - 30.

TOMATO BLIGHT IN NEW YORK: There is a lot of blight, apparently mostly Alternaria, in many tomato fields in Monroe County for this time of year.--R. G. Palmer, Weekly News Letter, July 3.

BACTERIAL CANKER OF TOMATO IN COLORADO: Bacterial canker was found on a few plants in Weld County. -- E. W. Bodine, Emergency Plant Disease Prevention Project. Week ending July 3.

CLUB ROOT OF CABBAGE IN NEW YORK: (Reports from Weekly News Letter, July 3). In Niagara County club root [Plasmodiophora brassicae] is showing up in seed beds on farms where it had not been seen before. Wet seasons and overflowed fields are spreading this problem wide. -- D. M. Dalrymple. In Monroe County club root is being reported rather frequently in cabbage seedbeds. -- R. G. Palmer.

LEAF SPOT OF OKRA IN SOUTHERN LOUISIANA: Leaf spot (Cercospora sp.) was rather severe on some plants in one field of about 2 acres at Chalmette in St. Bernard Parish. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. June 26 - 30.

ONION SMUT IN COLORADO: In company with J. L. Forsberg of the Colorado Experiment Station, a survey was made for onion smut (Urocystis cepulae) on plants grown for sets in the vicinity of Greeley in Weld County, during the week ending July 1. Fifty acres of onions 3 to 6 inches in height were surveyed. In one 3-acre field the stand was reduced 50% and 30% of the remaining plants were infected. In a 10-acre field, 10% of the plants were infected. In several fields totalling 24 acres from a trace to 1% of the plants showed smut infection. In the remaining 13 acres no infected plants were found. -- E. W. Bodine, Emergency Plant Disease Prevention Project.

BACTERIAL BLIGHT OF PEAS IN PENNSYLVANIA: On June 29, pea blight caused by Pseudomonas pisi was found in many fields planted with seed from Montana. Disease incidence counts showed that 18% of the pods were affected. Loss was slight since the peas were nearing the harvest period. -- C. C. Burke, Pennsylvania State College. July 1.

PEA DISEASES IN WESTERN MONTANA: Six fields of peas were examined, one south and 5 north of Flathead Lake. Common root rot (Aphanomyces euteiches) was present in all fields. Losses were light to moderate except in one field where it was estimated that at least 50% damage had occurred. Downy mildew (Peronospora pisi) was found doing slight damage in one field 4 miles north of Kalispell. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending June 24.

SPINACH RUST IN COLORADO: A few plants were found affected with rust (Puccinia sarcobati) [P. aristidae] in Pueblo County. -- E. W. Bodine, Emergency Plant Disease Prevention Project. Week ending June 24.

WATERMELON WILT IN SOUTHERN LOUISIANA: Wilt (Fusarium [oxysporum f.] niveum) was found in one small field near Baton Rouge where 30% or more of the plants were diseased. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. June 26 - 30.

BRIEF NOTES ON PLANT DISEASES

BLACK ROOT OF SUGAR BEETS IN WESTERN MONTANA: Black root was found on 30% of the sugar beet plants examined in one field near Missoula. -- C. M.

Slagg, Emergency Plant Disease Prevention Project. Week ending June 24.

DISEASES OBSERVED ON MISCELLANEOUS PLANTS IN WISCONSIN: The following diseases were observed on various miscellaneous plants during the period June 8 to 16: downy mildew (Peronospora parasitica) on shepherd's purse, Capsella bursa-pastoris, growing abundantly as a weed in wheat fields in Manitowoc County; downy mildew (Bremia lactucae) on wild lettuce, Lactuca scariola, in Fond du Lac County; brown rot (Monilinia johnsonii) on wild Crataegus sp., causing leaf blight and fruit rot, in Fond du Lac and Manitowoc Counties; shoot blight (Fusicladium radiosum) (Venturia tremulae) and ink spot or leaf blight (Sclerotinia bifrons) on quaking aspen, Populus tremuloides, in Kewaunee and Fond du Lac Counties; leaf spot (Guignardia bidwellii) on Virginia creeper, Psedera quinquefolia, in Rock and Brown Counties; leaf spot (Septoria cirsii) on Cirsium arvense in Dodge County; leaf rust (Puccinia peridermiospora) on ash, Fraxinus sp., in Fond du Lac County; rust (P. caricis) on nettle, Urtica gracilis, and wild black currant, Ribes americanum, in Fond du Lac County; telial stage of rust (P. podophylli) on mandrake, Podophyllum peltatum, in Kewaunee County; rust (P. sessilis) on blue flag, Iris versicolor, in Fond du Lac County; rust (P. rubigo-vera) on jewel weed, Impatiens sp., in Fond du Lac County and on virgins' bower, Clematis virginiana, in Kewaunee County; rust (Uromyces caladii) on Jack-in-the-pulpit, Arisaema triphyllum, in Kewaunee County. -- Edwin C. Honey, Emergency Plant Disease Prevention Project.

A CORRECTION: FOMES ON OAK IN WISCONSIN: Edwin E. Honey writes that the report of Fomes igniarius on white oak in PDR (27 (23): 641. Nov. 15, 1943) is an error. The fungus concerned is F. everhartii instead.

SPECIMENS WANTED: The Division would like to have specimens of Cercospora spp. on okra, and of various leaf spots on parsnips.

THE NOMENCLATURE OF THE CEREAL SMUT FUNGI

John A. Stevenson and Aaron G. Johnson

Under date of April 30, 1940, the Secretary of Agriculture approved as official for the Department of Agriculture, the International Rules of Botanical Nomenclature for all plants, including fungi, and, in Bureau Memorandum 1123, July 18, 1940, the Bureau of Plant Industry concurred. A strict adherence to these rules involves a number of changes in names now commonly used in American mycological practise. This is particularly true in the case of the cereal smut fungi. This phase of the problem has been under consideration for some time and a tentative list of names for these fungi was prepared and submitted to mycologists interested in the group both here and in Canada and England in an effort to secure as wide an expression of opinion as possible. The names presented here are those that appear to be applicable under the rules, as interpreted by the writers, after giving all possible consideration to the opinions and suggestions of those who have critically studied our proposals. In each case pertinent synonymy is given and comment offered where necessary to explain our reasons for decisions made.

It may be noted that under the rules the starting point for the nomenclature of the smut fungi is Persoon's Synopsis Methodica Fungorum, published in 1801. The latest edition of the Rules is the third, published in 1935, and based on the decisions of the 5th International Botanical Congress of Cambridge, 1930. Changes made by the 6th Congress, Amsterdam, 1935, as published in the proceedings of the Congress (1936) also have been considered in arriving at decisions.

The nomenclature of the cereal smut fungi as here presented is based on present day American species concepts. Proposals for taxonomic changes as made by Fischer, (Mycologia 35:610-619. 1943), Hirschhorn (Physis 15:103-111. 1939) and others when accepted, will necessarily make for corresponding changes in nomenclature. It is emphasized that nomenclature is secondary to taxonomy.

We acknowledge with much appreciation critical comment and helpful suggestions from the many mycologists in the United States, Canada, and England to whom the manuscript in its several "editions" was submitted.

ENTYLOMA ORYZAE, LEAF SMUT OF RICE
Entyloma oryzae H. & P. Syd. Ann. Myc. 12: 197. 1914.

SPHACELOTHECA CRUENTA, LOOSE KERNEL SMUT OF SORGHUM
Sphacelotheca cruenta (Kuehn) A. A. Potter Phytopath. 2: 98. 1912.
Ustilago cruenta Kuehn Hamburg. Gart. u. Blumenzeitg. 28: 177-178. 1872.

SPHACELOTHECA DESTRUENS, BROOMCORN MILLET SMUT
Sphacelotheca destruens (Schlecht.) Stevenson & A. G. Johnson, Phytopath. 34: 613. 1944.
Uredo segetum subsp. panici-miliacei Pers. Syn. Fung., p. 224. 1801
Uredo carbo var. panici-miliacei DC. Flore Franç. 6: 76. 1815.
Caeoma destruens Schlecht. Fl. Berol. 2: 130. 1824. Link in Willdenow Sp. Plant. 6 (2): 3. 1824.
Uredo destruens Duby Bot. Gall. 2: 901. 1830.
Tilletia destruens Lév. Ann. Sci. III. 8: 372. 1848.
Ustilago panici-miliacei Wint. in Rab. Krypt. Fl. 1: 89. 1884.
Sorosporium panici-miliacei Tak. Bot. Mag. Tokyo 16:184, 247. 1902.
Sphacelotheca panici-miliacei Bub. Houby Ceske 2: 27. 1912.

As was pointed out (Phytopath. 34:613. 1944), when the binomial Sphacelotheca destruens was set up, Persoon's subspecific name, panici-miliacei, cannot be legitimately used for this species since the specific epithet destruens is available and must be taken up under the provisions of section II, article 58 of the rules.

SPHACELOTHECA REILIANA, HEAD SMUT OF CORN AND SORGHUM
Sphacelotheca reiliana (Kuehn) Clint. Jour. Myc. 8: 141. 1902.
Ustilago reiliana Kuehn in Rabenhorst Fungi Europ. Century 20, no. 1998. 1875.

Ustilago abortifera Speg. Ann. Mus. Nac. Buenos Aires 6:207. 1899.
Cintractia reiliana Clint. Bull. Ill. Agric. Exp. Sta. 57:346. 1900.
Sorosporium reilianum McAlp. Smuts of Australia, p. 181. 1910.

Ciferri (Flora Ital. Crypt. Fasc. 17: 267-268. 1938) proposes for this species the name Sphacelotheca holci-sorghi (Rivolta) Cif. He derives the new combination from Rivolta's Ustilago holci-sorghi (U. holci sorgi) described in his Dei parasiti vegetali, p. 422, 1873.

Ciferri (loc. cit. p. 269-270) states that "Rivolta's species described on Holcus sorghum is almost certainly referable to Ustilago reiliana" and if this be so, Rivolta's specific name would hold for the species inasmuch as it has priority. However, we have read Rivolta's very brief note concerning this smut and it appears much more probable in our opinion that he was dealing with one of the kernel smuts. He states "the greater part of the grains have not been attacked; the hull is intact, but the inside filled with a coffee-colored substance composed of spores". It does not appear that Ciferri actually studied a specimen which could be considered Rivolta's type or even material authentically named by the latter. Under such circumstances we consider Rivolta's name a nomen dubium under the provisions of Section 12, Article 63, and reject it, which leaves the way clear for the use of the specific epithet reiliana.

SPHACELOTHECA SORGHI, COVERED KERNEL SMUT OF SORGHUM

Sphacelotheca sorghi (Lk.) Clint. Jour. Myc. 8: 140. 1902.
Sporisorium sorghi Lk. in Willd. Species Plant. 6 (2): 86. 1825.
Tilletia sorghi-vulgaris Tul. Ann. Sci. Nat. III. 7: 116. 1847.
Ustilago sorghi Pass. Hedw. 12: 114. 1873.
Cintractia sorghi-vulgaris Clint. Bull. Ill. Agric. Exp. Sta. 47: 404. 1897.

TILLETIA CARIES, ROUGH SPORED BUNT OR STINKING SMUT OF WHEAT AND RYE

Tilletia caries (DC.) Tul. Ann. Sci. Nat. III. 7: 113. 1847
Uredo caries DC. Flora Franç. 6: 78. 1815.
Uredo secalis Cda. Oekon. Neuigk. und Verh. 1: 10. 1848.
Tilletia secalis Kuehn Deutsche. Landw. Zeitung 19: 650. 1876 et Bot. Zeit. 34: 470. 1876.

For the most part this species has been referred to as Tilletia tritici (Bjerk.) Wint. (in Rab. Krypt. Fl. 1: 110. 1881), although it has been noted recently that T. tritici (Bjerk.) Wolf (Der Brand des Getreides u.s.w., p. 13, 1874) has priority over the preceding binomial. In both cases the specific epithet tritici is derived from Lycoperdon tritici of Bjerkander (in Kgl. Sv. Akad. Handl. p. 326, 1775) who gave a general account of wheat smut, but without formal descriptions. Persoon (Syn. Fung. 1:224. 1801) cited Bjerkander's name as a synonym of his Uredo segetum subsp. Uredo tritici, which variety was referred to as "subeffusa" and is now given specific rank as Ustilago tritici (Pers.) Rostr., the loose smut of wheat. As to just which smut Bjerkander worked with is highly controversial, Liro (Die Ustilagineen Findlands II. p. 366. 1938) outlining his reasons for believing that loose smut was involved, and on the other hand Winter in

Rabenhorst Krypt. Flora Deutschlands 1:110, 1881, made the combination T. tritici (Bjerk.) Wint., believing that Bjerkander had the bunt fungus in hand. Miss Wakefield suggests that it seems probable that Bjerkander had both smuts and did not distinguish between them.

In view of the fact that Bjerkander's name antedates the starting point (1801) of nomenclature for the Ustilaginales, and that it appears to be decidedly a "nomen confusum", it is clear that another name must be sought for the rough spored bunt. Even if a case could be made for Persoon's sub specific epithet tritici, it could not be used under the provisions of section 11, article 58 since a validly published specific epithet (caries) is available. Under Uredo caries, DeCandolle in 1815 fairly adequately described the fungus, noting that it was foetid and deformed the grain but little. Tulasne transferred this species to Tilletia as T. caries (DC.) Tul., which appears to be the legitimate name under International rules and has in fact been rather generally used in Europe.

TILLETIA FOETIDA, SMOOTH SPORED BUNT OR STINKING SMUT OF WHEAT AND RYE

Tilletia foetida (Wallr.) Liro Maanviljelys. Talondellinen Koelaitos, Vuosikvija 1915-16, p. 27. 1920.

Erysibe foetida Wallr. Flora Crypt. Germaniae 2: 213. 1833.

Ustilago foetens Berk. and Curt. in Ravenel Fungi Car. exsic. Century V, no. 100. 1860. Grevillea 3: 59. 1874.

Tilletia laevis (levis) Kuehn in Rab. Fungi Europ. Century 17, no. 1697. 1873. Hedw. 12: 152. 1873.

Tilletia foetens Schroet. in Cohn Beitr. z. Biol. d. Pfl. 2: 365. 1877.

Tilletia foetens Trel. Trans. Wisc. Acad. Sci.Arts. and Letters 6:139. 1[illegible]

In this case foetida is selected as the legitimate epithet in preference to the more commonly used foetens on a clear basis of priority as pointed out by Liro (l.c.).

TILLETIA HORRIDA, BUNT OR KERNEL SMUT OF RICE

Tilletia horrida Tak. Bot. Mag. Tokyo 10: 20. 1896.

UROCYSTIS OCCULTA, FLAG SMUT OR STALK SMUT OF RYE

Urocystis occulta (Wallr.) Rab. in Kl. Herb. Viv. Myc. ed. 2, Century IV, No. 393. 1856.

Erysibe occulta Wallr. Flora Crypt. Germaniae 2: 212. 1833.

Tuberdinia occulta Liro Ann. Univ. Fenn. Aboensis A, 1, 1: 12. 1922.

See note under Urocystis tritici.

UROCYSTIS TRITICI, FLAG SMUT OF WHEAT

Urocystis tritici Koern. Hedw. 16: 33. 1877.

Tubercinia tritici Liro Ann. Univ. Fenn. Aboensis A, 1, 1: 17. 1922.

It has been moved (Trans. Brit. Myc. Soc. 23: 214, 223-4, 1939 and Phytopath. 30: 453-4. 1940) to conserve Urocystis against Tubercinia and therefore the binomials Urocystis tritici and U. occulta will be used unle[illegible]

and until a regularly constituted International Botanical Congress rules otherwise. Under the rules of course such proposals must be passed upon by the executive committee (Art. 22), but the present case appears to us logical and proper.

USTILAGO AVENAE, LOOSE SMUT OF OATS

Ustilago avenae (Pers.) Rostr. Overs. K. Danske Vid. Selsk. Forh. 1890: 13. March, 1890.

Uredo segetum subsp. avenae Pers. Syn. Fung. p. 224. 1801.
Uredo carbo var. avenae DC. Flora Franç. 6: 76. 1815.
Ustilago segetum var. avenae Jens. Jour. Roy. Agric. Soc. England 24 (ser. 2): 407. 1888. (Nomen nudum)
Ustilago segetum var. avenae Jens. Om Kornsorternes Brand, p. 61. 1888. (Nomen nudum).
Ustilago avenae Jens. Charb. Cereals, p. 4. 1889. (Nomen nudum)
Ustilago avenae (Pers.) Jens. ex Kell. and Swing. Ann. Rept. Kans. Agric. Exp. Sta. 2: 215. June, 1890.

Corda's Uredo avenae (Oek. Neuigk. und Verh. 2: 486-7. 1846), from a study of his description and illustrations, appears to be the covered smut and the name is hence not properly a synonym of U. avenae (Pers.) Rostr. and the transfer of the name to Ustilago would set up a later homonym. Corda's name being thus eliminated and there being no other specific epithet available, Persoon's subspecific avenae may be taken up for transfer to Ustilago as was apparently first definitely done by Rostrup (l.c.). The combination is ordinarily credited to Jensen either on the basis of his use of the binomial in 1888 (Le Charbon des cereales) or on the set-up as given by Kellerman and Swingle in June, 1890 in the second report of the Kansas Experiment Station. However, the latter usuage is ruled out by priority and the former by the fact that Jensen does not indicate whether he bases his name on Persoon's subspecies or is setting it up "de novo".

USTILAGO CRAMERI, MILLET SMUT

Ustilago crameri Koern. in Fckl. Jahrb. Nass. Ver. Nat. 27-28: 11. 1873.

USTILAGO HORDEI, COVERED SMUT OF BARLEY

Ustilago hordei (Pers.) Lagerh. Mitt. d. Badischen Bot. Ver., p. 70. March, 1889.

Uredo segetum subsp. hordei Pers. Syn. Fung., p. 224. 1801.
Ustilago carbo var. hordei DC. Flora Franç. 6: 76. 1815.
Ustilago segetum var. hordei Rab. Herb. Myc. Ed. II, no. 397. 1856.
Ustilago segetum var. hordei f. tecta Jens. Om Kornsorternes Brand, p.61. 1888.
Ustilago segetum var. tecta Jens. Jour. Roy. Agric. Soc. England 24 (ser. 2): 406. 1888.
Ustilago hordei var. tecta Jens. Charb. Cereales, p. 4. 1889.
Ustilago jensenii Rostr. Overs. Kong. Dansk. Vidensk. Selsk. Forh. 1890: 12-13. March, 1890.
Ustilago hordei Kell. & Swing. Ann. Rept. Kan. Agric. Exp. Sta. 2:268. June, 1890.

Brefeld (Nachr. Klub Landw. Berlin 221: 1593. June, 1888) under the name U. hordei Bref. studied in detail the loose smut of wheat and the loose and covered smuts of barley. Some European writers have applied his name to the loose smut of barley, a usage for which a case of sorts can be made out, but which would result in such confusion and uncertainty that it is felt that Brefeld's name should be rejected under the provisions of Article 62 of the Rules which provides, "a name of a taxonomic group must be rejected if owing to its use with different meanings, it becomes a permanent source of confusion or error." Such a course we feel carries out the spirit of the Rules as expressed in one of the "guiding principles" (Article 4): "The essential points in nomenclature are (1), to aim at fixity of names, (2) to avoid or to reject the use of forms and names which may cause error or ambiguity or throw science into confusion."

USTILAGO KOLLERI, COVERED SMUT OF OATS

Ustilago kolleri Wille Bot. Notiser 1893: 10. 1893.
Ustilago avenae var. levis Kell. & Swing. Ann. Rept. Kans. Agric. Exp. Sta. 2:259. 1890.
Ustilago levis Magn. Ber. Natur-Wiss.-Mediz. Ver. Innsbruck 21: 22. 1894.

This departure from established American practice of using the binomial U. levis for the covered oat smut is necessitated by Section 11, Article 58 of the International Rules.

USTILAGO MAYDIS, CORN SMUT

Ustilago maydis (DC.) Cda. Icones Fung. 5: 3. 1842.
Lycoperdon zeae Beck. Hannov. Mag. 6: 1330. 1768.
Uredo segetum var. mays-zeae DC. Flore Franç. 2: 506. 1805.
Uredo maydis DC. Flore Franç. 6: 77. 1815.
Uredo zeae Schw. Schr. Nat. Ges. Leipzig 1:71. 1822.
Erysibe maydis Wallr. Fl. Crypt. Germ. 2: 215. 1833.
Ustilago zeae Ung. Einfl. Bodens, p. 211. 1836.
Ustilago mays-zeae Magn. in Verh. Bot. Ver. Prov. Brandenb. 37: 72. 1895.

The specific epithet zeae is not available for the corn smut since it is pre-Persoonian (1801). Persoon (Syn. Fung.) does not include any reference to corn smut. De Candolle's varietal name mays-zeae is likewise not available under Section 11, Article 58 of the Rules. Ciferri cites the binomial Uredo zeae-mays DC. (Syn. Pl. Flora Gallica 1: 47. 1806) which would provide a specific name were there any such name. Examination of this reference reveals that De Candolle merely lists Zea mays (as Mays zeae) as one of the hosts of Uredo segetum, with no suggestion of any such name as Uredo zeae-mays.

USTILAGO NIGRA, SHALLOW-BORNE LOOSE SMUT OF BARLEY

Ustilago nigra Tapke Phytopath. 22: 869. 1932. Jour. Agr. Res. 51: 491-508. 1935.

From the extensive investigations of Tapke (as cited above and as reported in Phytopathology 33: 194-209. 1943) it is clear that Ustilago medians Bied. (Zeitschr. f. Pflanzenkr. 4: 321-322. 1894), was based on a mixture of U. nuda (Jens.) Rostr. and U. nigra Tapke. Under the provisions of Article 64 of the Rules, Biedenkopf's epithet is rejected.

USTILAGO NUDA, DEEP-BORNE LOOSE SMUT OF BARLEY

Ustilago nuda (Jens.) Rostr. Tidsskrift f. Landökonomi 8: 745. 1889.
Ustilago segetum var. hordei f. nuda Jens. Om Kornsorternes Brand, p.61. 1888.
Ustilago segetum var. nuda Jens. Jour. Roy. Agric. Soc. England 24 (ser. 2): 406. 1888.
Ustilago hordei nuda Jens. Charb. Cereales, p. 4. 1889.
Ustilago nuda Kell. & Swing. Ann. Rept. Kan. Agric. Exp. Sta. 2: 277. June 1890.

As previously noted Brefeld's U. hordei has been applied to this loose smut by some European workers, but its use would lead to endless and hopeless confusion. Eliminating it as a "nomen ambigua" the way is open to the use of the specific epithet nuda, which brings the situation into line with practically universal present day usage. Cunningham (Trans. N. Zealand Insti. 55: 409. 1924) and others have treated this form and the loose smut of wheat as one species, but this is a matter of taxonomy and not nomenclature to which we are here confining ourselves.

USTILAGO TRITICI, LOOSE SMUT OF WHEAT

Ustilago tritici (Pers.) Rostr. Overs. Kong. Danske Vidensk. Selsk. Forh. 1890: 15. March, 1890.
Uredo segetum subsp. tritici Pers. Syn. Fung., p. 224. 1801.
Ustilago segetum var. tritici Jens. Jour. Roy. Agric. Soc. England 24 (ser. 2): 407. 1888.
Ustilago tritici Jens. in Kell. & Swing. Ann. Rept. Kan. Agric. Exp. Sta. 2: 262. June, 1890.

The epithet usually applied to this species is U. tritici (Pers.) Jensen, which combination was made by Kellerman and Swingle in June 1890. However, Rostrup (l.c.) made the same combination, i. e. U. tritici (Pers.) Rostr., in March 1890. Therefore this latter binomial takes precedence. As indicated in both cases, the specific epithet "tritici" was based on Persoon's sub-species name "Uredo segetum β Uredo tritici" (Syn. Meth. Fung. p. 224, 1801). Persoon, in turn based this name on Bjerkander's "Lycoperdon tritici", which was clearly described in 1775 as applying only to what is now known as Tilletia caries (DC.) Tul. (T. tritici (Pers.) Wint.). Therefore it is clear that Persoon's "tritici" should represent this latter fungus only. However, since Rostrup wrote into his combination the Persoon citation, that is, U. tritici (Pers.) Rostrup, this becomes the accepted designation.

THE CEREAL SMUT FUNGI

Common name	Scientific name according to	
	The International Rules of Botanical Nomenclature	Previous American Practise
Leaf smut of rice	Entyloma oryzae H. & P. Syd.	E. oryzae H. & P. Syd
Loose kernel smut of sorghum	Sphacelotheca cruenta (Kuehn) A. A. Potter	S. cruenta (Kuehn) A. A. Potter
Smut of broom corn millet	Sphacelotheca destruens (Schlecht.) Stevenson & A. G. Johnson	S. panici-miliacei (Pers.) Bub.
Head smut of corn and sorghum	Sphacelotheca reiliana (Kuehn) Clint.	S. reiliana (Kuehn) Clint.
Covered kernel smut of sorghum	Sphacelotheca sorghi (Lk.) Clint.	S. sorghi (Lk.) Clint
Rough spored bunt of wheat and rye	Tilletia caries (DC.) Tul.	T. tritici (Bjerk.) Wint.
Smooth spored bunt of wheat and rye	Tilletia foetida (Wallr.) Liro	T. foetens (Berk. & Trel. or T. levis Kuehn
Kernel smut of rice	Tilletia horrida Tak.	T. horrida Tak.
Flag smut or stalk smut of rye	Urocystis occulta (Wallr.) Rab.	U. occulta (Wallr.) Rab.
Flag smut of wheat	Urocystis tritici Koern.	U. tritici Koern.
Loose smut of oats	Ustilago avenae (Pers.) Rostr.	U. avenae (Pers.) Je
Millet smut	Ustilago crameri Koern.	U. crameri Koern.
Covered smut of barley	Ustilago hordei (Pers.) Lagerh.	U. hordei (Pers.) Kell. & Swing.
Covered smut of oats	Ustilago kolleri Wille	U. levis (Kell. & Swing.) Hagn.
Corn smut	Ustilago maydis (DC.) Cda.	U. zeae (Beckm.) Ung
Shallow-borne infecting loose smut of barley	Ustilago nigra Tapke	U. nigra Tapke
Deep-borne loose smut of barley	Ustilago nuda (Jens.) Rostr.	U. nuda (Jens.) Kell & Swing.
Loose smut of wheat	Ustilago tritici (Pers.) Rostr.	U. tritici (Pers.) Rostr.

DIVISION OF MYCOLOGY AND DISEASE SURVEY, and DIVISION OF CEREAL CROPS AND DISEASES.